

## PATENT SPECIFICATION

NO DRAWINGS

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## COMPLETE SPECIFICATION

## Dressing for Wounds

We, PARACHEM CORPORATION, a Corporation organized under the laws of the State of New Jersey, United States of America, of 630 Fifth Avenue, New York, State of New York, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to dressings for wounds.

There has been disclosed in U.S. Patent No. 3,328,259 a dressing comprising a flexible body large enough to cover an open lesion and containing a water-soluble, plasma-soluble cellulose derivative having hemostatic and film-forming properties and having the property of combining with the plasma in a wound to form with said plasma an artificial water-insoluble eschar. The cellulose derivative is present in integral non-discrete form in said flexible body and in proportions to cause said body to be effective in coagulating the plasma issuing from a moist lesion to which the dressing is applied.

The dressing, for the purpose described, may be in the form of a pad or sheet, and the flexible plasma-soluble body may, for example, consist essentially of a sodium salt of carboxymethyl cellulose or of hydroxy ethyl cellulose, serving as the hemostatic agent. These film-forming compounds, especially when aerated or in porous form, are dramatically effective in quickly coagulating plasma from a flowing wound to which they are applied, and the eschar formed therefrom is readily absorbable in body fluids. However, a dressing, made mainly of these very actively hemostatic compounds, when applied to a free flowing wound, affords little containment, especially when in aerated or porous form. For surface bandages, this can be overcome by casting the dressing body onto a plasma-insoluble, absorbent backing, such as polyureth-

ane foam, which will absorb the excess plasma fluid discharged from the wound. Where the dressing is to be used in body cavities, or for application to internal wounds, where the dressing must be absorbed in the body, the use of a plasma-insoluble backing would be undesirable.

One object of the present invention, is to provide a dressing which is highly hemostatic in its primary action, which affords a substantial degree of containment against excess flow of plasma from a wound to which it is applied, and which is completely absorbable in the body.

In accordance with the invention there is provided a laminated dressing for a wound comprising a laminated structure made up of two continuous layers of film forming material arranged face to face, both layers being plasma-soluble, one layer constituting a primary layer adapted to be applied directly to the wound, and being more readily soluble in plasma than the other layer, the other layer constituting a secondary layer serving as a backing for said primary layer.

The primary layer of the dressing, which is preferably actively hemostatic, may comprise a cellulose derivative, and a suitable compound for the purpose is the sodium salt of carboxymethyl cellulose or hydroxy ethyl cellulose. These compounds are highly active as hemostatic agents, and may be employed in dense or aerated form, according to the degree of hemostatic activity desired. In dense form, these compounds are less active hemostatically, but are still hemostatic, but in aerated or porous form, they are highly hemostatically active, but being porous, will offer very little containment when applied to a free flowing wound, unless applied in bulky form.

The backing employed as a secondary layer in conjunction with the primary hemostatic body described is, desirably, also a cellulose derivative but less soluble in plasma than said body, and a suitable derivative for that pur-

pose is methyl cellulose. This compound in dense form, has little or no hemostatic properties, and in aerated or porous form is hemostatic but to a substantially lesser degree than is the sodium salt of carboxymethyl cellulose or the hydroxy ethyl cellulose in aerated or porous form. However, whether the methyl cellulose is employed as a backing in dense or aerated form, it is soluble in plasma at body temperature, but much more slowly than is the sodium salt of carboxymethyl cellulose or the hydroxy ethyl cellulose in aerated or porous form, and therefore, affords substantial containment against an excess of plasma from a wound to which the dressing is applied, and not coagulated by the main body of the dressing.

Another cellulose derivative that can be used as a backing for the dressing is a compound called hydroxy-alkyl ether of cellulose, sold by Hercules Powder Company under the trademark Klucel. Its solvency in water is very similar to that of methyl cellulose.

When the primary and secondary laminas of the dressing are both cellulose derivatives and both water-soluble, they are compatible and can be made to adhere face to face into a single coherent laminated structure by merely wetting their confronting faces and pressing them together.

The primary layer of the dressing may be formulated with antiseptic, medicinal, germicidal and/or antibiotic materials such as iodine, sulfanilamide, sulfathiazole or sulfadiazine. The primary layer may also contain a plasticizer and a humectant. The former is usually a liquid saturated acyclic alcohol, substituted or unsubstituted, containing normally not in excess of six hydroxy groups. Humectants which are particularly suitable are polyethylene glycols, having molecular weights of about 150, 200 and 300, triethanolamine, sorbitol and alkanolamine sulfamates. Specific formulations are disclosed in the previously mentioned U.S. Patent No. 3,328,259.

The primary layer may be free from air or aerated into porous sheets or films as described in said U.S. Patent No. 3,328,259. The thickness of the primary layer will depend on the specific part of the body to which the dressing is to be applied and the nature of the wound.

The secondary layer to be used as a backing for the dressing, in a specific example, is a methyl cellulose, plasticized with a 30% glycol derivative, such as polyethylene glycol, and formed as a dense film or sheet on a Teflon poly-(tetrafluoroethylene) belt. The word 'Teflon' is a registered Trade Mark. This film or sheet may be as thin as 3 to 4 thousands of an inch, or thicker, depending on the degree of containment desired, and its solubility may be varied by the addition of suitable salts or by a variation of its density up to the aerated or porous state.

The primary and secondary layers are as-

sembled by wetting confronting faces of the two layers with water and feeding them through compression rollers, to bring the layers into face to face adhering contact and to form a laminated structure thereby. The contacting faces of the layers will be bonded together by the water serving as the common solvent.

With the laminated dressing described, the primary layer applied directly to a free flowing wound will immediately dissolve in and coagulate the plasma and release its medication, while the secondary backing layer remains to contain any excess plasma flowing from the wound. Eventually, this secondary layer will dissolve in the plasma and be absorbed by the body.

With the laminated dressing described, a wound is protected for prolonged healing, if required, and the life of the dressing before complete absorption in the body, can be controlled in the manufacture of the dressing, by the different factors described.

Although the primary layer is described as being hemostatic, as far as certain aspects of the invention are concerned, it need not be so, as long as it is water-soluble or plasma-soluble, and can serve as a vehicle for medication, released upon dissolution in the plasma.

#### WHAT WE CLAIM IS:—

1. A laminated dressing for a wound comprising a laminated structure made up of two continuous layers of film-forming material arranged face to face, both layers being plasma-soluble, one layer constituting a primary layer adapted to be applied directly to the wound, and being more readily soluble in plasma than the other layer, the other layer constituting a secondary layer serving as a backing for said primary layer.

2. A laminated dressing as described in claim 1, in which both layers constitute cellulose derivatives.

3. A laminated dressing according to claim 1 or 2, in which the primary layer is hemostatically active.

4. A laminated dressing according to claim 3, in which the primary layer is composed of a sodium salt of carboxymethyl cellulose or hydroxy ethyl cellulose.

5. A laminated dressing according to any one of the preceding claims, in which the secondary layer contains methyl cellulose or a hydroxyalkyl ether of cellulose.

6. A laminated dressing according to any one of the preceding claims, in which the primary layer is in porous form.

7. A laminated dressing according to any one of the preceding claims, in which the secondary layer is in dense form.

7. A laminated dressing according to any one of the preceding claims, in which the primary layer contains a medicament.

9. A laminated dressing according to claim 1 substantially as hereinbefore described.

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